

CLAIMS

We claim:

1 1. A tendon-anchored offshore platform comprising a lateral mooring system (LMS), where
2 the LMS comprises a plurality of catenary mooring lines anchored to a seabed and attached to the
3 platform, where the LMS is designed to reduce installation and/or operation costs and/or to provide
4 installation and/or operation performance benefits and where the LMS can be attached to the
5 platform prior to, during or after tendon installation.

1 2. The platform of claim 1, wherein, the mooring lines are anchored to the seabed in a spaced
2 apart configuration surrounding an installation site of the platform, include buoys that adjust the
3 vertical component of the mooring line forces acting on the platform and attached to the platform
4 in a pattern adapted to allow the LMS to impart on the platform a force in any desired direction and
5 directed primarily parallel to a surface of the sea due to the buoys on the mooring lines.

1 3. The platform of claim 1, wherein the platform is a spar platform, tension leg platform or
2 extended-base tension leg platform.

1 4. The platform of claim 1, wherein the platform is a spar platform.

1 5. The platform of claim 1, wherein the platform is a tension leg platform.

1 6. The platform of claim 1, wherein the platform is an extended-base tension leg platforms.

1 7. A tendon-anchored offshore platform comprising a substructure supporting a deck, a
2 plurality of tendons anchoring the substructure to a seabed under tension and lateral mooring system
3 (LMS) having a plurality of catenary mooring lines anchored to the seabed and attached to the
4 platform, where the LMS is adapted to reduce installation and/or operation costs and/or to provide
5 installation and/or operation performance benefits.

1 8. The platform of claim 7, wherein, the mooring lines are anchored to the seabed in a spaced
2 apart configuration surrounding an installation site of the platform, include buoys that adjust the

vertical component of the mooring line forces acting on the platform and attached to the platform in a pattern adapted to allow the LMS to impart on the platform a force in any desired direction and directed primarily parallel to a surface of the sea due to the buoys on the mooring lines.

9. The platform of claim 7, wherein the platform is a spar platform, tension leg platform or extended-base tension leg platform.

10. The platform of claim 7, wherein the platform is a spar platform.

11. The platform of claim 7, wherein the platform is a tension leg platform.

12. The platform of claim 7, wherein the platform is an extended-base tension leg platforms.

13. A method for installing a tension-anchored offshore platform comprising the steps of:
positioning a platform near a desired off-shore site or location;
attaching a plurality of seabed anchored lateral mooring lines to the platform;
adjusting lengths of the mooring lines to position and hold the platform on station over the site;
ballasting the platform and attaching the pre-installed tendons to tendon connectors a base of the platform.; and
deballasted the platform to tension the tendons.

14. The method of claim 13, further comprising the step of:
continuously or periodically adjusting the lengths of the mooring lines to maintain the platform in a substantially zero-force condition.

15. The method of claim 13, further comprising the step of:
continuously or periodically monitoring forces acting on the platform via force sensor on the tendons and the mooring lines; and
continuously or periodically adjusting the lengths of the mooring lines in response to the forces acting on the platform to maintain the platform in a substantially zero-force condition.

1 16. The method of claim 13, further comprising the step of:
2 continuously or periodically receiving force data from sensors attached to the tendons and
3 the mooring lines;
4 continuously or periodically calculating a net force acting on the platform from the force
5 data; and
6 continuously or periodically adjusting the lengths of the mooring lines in response to the
7 calculated force acting on the platform to maintain the platform in a substantially zero-force
8 condition.

1 17. A method for installing an tendon-anchored offshore platform including the steps of:
2 attaching a plurality of temporary stabilization modules to platform and transporting the
3 platform near a desired off-shore site or location;
4 positioning the platform near the desired site
5 attaching a lateral mooring system including a plurality of seabed anchored lateral mooring
6 lines are attached to the platform;
7 adjusting lengths of the attached mooring lines to position and hold the platform on station
8 over the site;
9 ballasting the platform and attaching a plurality of pre-installed tendons to tendon connectors
10 on a base of the platform;
11 deballasting the platform to tension the tendons; and
12 removing the stabilization modules;
13 after tensioning, the mooring lines maybe disconnected, but preferably, the lines are left
14 attached to the platform and are used during post-installation operations to reduce horizontal
15 displacement due to wind and/or sea currents by adjusting the lengths of the mooring lines to impose
16 a force substantially equal and opposite to the environmental forces acting on the platform.

1 18. The method of claim 17, further comprising the step of:
2 continuously or periodically adjusting the lengths of the mooring lines to maintain the
3 platform in a substantially zero-force condition.

1 19. The method of claim 17, further comprising the step of:
2 continuously or periodically monitoring forces acting on the platform via force sensor on the

tendons and the mooring lines; and
continuously or periodically adjusting the lengths of the mooring lines in response to the
forces acting on the platform to maintain the platform in a substantially zero-force condition.

20. The method of claim 17, further comprising the step of:
continuously or periodically receiving force data from sensors attached to the tendons and
the mooring lines;
continuously or periodically calculating a net force acting on the platform from the force
data; and
continuously or periodically adjusting the lengths of the mooring lines in response to the
calculated force acting on the platform to maintain the platform in a substantially zero-force
condition.

21. A method for installing a tendon-anchored offshore platform including the steps of:
transporting the platform near an installation site;
attaching a lateral mooring system (LMS) including a plurality of seabed anchored mooring
lines to the platform;
adjusting lengths of the lines to position the platform on station over a pre-installed seabed
tendon anchor;
attaching a tendon to a working part of a drilling rig associated with a deck of the platform;
lowering the tendon until a distal end of the tendon having an anchor connector is positioned
directly above the tendon anchor, which has a tendon connector associated therewith;
stabbing the tendon into the anchor with sufficient force so that the anchor connector and the
tendon connector lockingly engage to form an installed tendon;
repeating the previous four step until all the tendons are installed;
adjusting lengths of the mooring lines to position and hold the platform on station over the
site;
ballasting the platform and attaching the pre-installed tendons to tendon connectors a base
of the platform.; and
deballasted the platform to tension the tendons.

22. The method of claim 21, further comprising the step of:

continuously or periodically adjusting the lengths of the mooring lines to maintain the platform in a substantially zero-force condition.

23. The method of claim 21, further comprising the step of:
continuously or periodically monitoring forces acting on the platform via force sensor on the tendons and the mooring lines; and
continuously or periodically adjusting the lengths of the mooring lines in response to the forces acting on the platform to maintain the platform in a substantially zero-force condition.

24. The method of claim 21, further comprising the step of:
continuously or periodically receiving force data from sensors attached to the tendons and the mooring lines;
continuously or periodically calculating a net force acting on the platform from the force data; and
continuously or periodically adjusting the lengths of the mooring lines in response to the calculated force acting on the platform to maintain the platform in a substantially zero-force condition.

25. A method for drilling wells at a desired site using a tendon-anchored offshore platform including the steps of:
transporting the platform near a drilling, production and installation site;
attaching a lateral mooring system (LMS) including a plurality of seabed anchored mooring lines to the platform;
adjusting lengths of the mooring lines to position and hold the platform on station above a well to be drilled;
ballasting the platform and attaching a plurality of pre-installed tendons associated with the well to be drilled to tendon connectors on a base of the platform;
deballasting the platform to tension the tendons; and
drilling the well;
after well completion; repeating the previous four steps until all the wells have been drilled;
adjusting lengths of the mooring lines to position and hold the platform on station over a production site;

15 ballasting the platform and attaching the pre-installed tendons to tendon connectors a base
16 of the platform.; and
17 deballasted the platform to tension the tendons

18 26. The method of claim 25, further comprising the step of:
19 after installation at the production site, continuously or periodically adjusting the lengths of
20 the mooring lines to maintain the platform in a substantially zero-force condition.

1 27. The method of claim 25, further comprising the step of:
2 after installation at the production site, continuously or periodically monitoring forces acting
3 on the platform via force sensor on the tendons and the mooring lines; and
4 continuously or periodically adjusting the lengths of the mooring lines in response to the
5 forces acting on the platform to maintain the platform in a substantially zero-force condition.

1 28. The method of claim 25, further comprising the step of:
2 after installation at the production site, continuously or periodically receiving force data from
3 sensors attached to the tendons and the mooring lines;
4 continuously or periodically calculating a net force acting on the platform from the force
5 data; and
6 continuously or periodically adjusting the lengths of the mooring lines in response to the
7 calculated force acting on the platform to maintain the platform in a substantially zero-force
8 condition.

1 29. The method of claim 25, further comprising the step of:
2 adjusting the lengths of the mooring lines to position and hold the platform on station over
3 each complete well; and
4 attaching a riser to each well and to the platform.